SaskPower

Environment Review 2003

On the cover: Julissa Moreau (l) and Carey Thibodeau, from Westview School in Estevan, Saskatchewan, visited with Heather Pyra and Lisa Mayer of SaskPower's Shand Greenhouse to see first-hand how waste heat from the nearby Shand Power Station is used to grow more than 460,000 tree and shrub seedlings annually.

Carey and Julissa participated in the Shand Greenhouse's Energy and Our Environment Poster Contest, which asks students from across the province to share their ideas on how to address the issue of climate change.

Vision: Excelling in competitive energy markets.

Mission: We deliver power in a safe, reliable, cost-effective and environmentally responsible manner.

Values: We are committed to respect, integrity and openness in all we do.

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HIGHLIGHTS

Our Environment Review gives us the opportunity to present SaskPower's ongoing environmental activities. It also allows us to join our partners and customers in reflecting upon our performance while we further our vision for a sustainable future. We invite you to learn more about us by visiting our web site at saskpower.com.

An updated corporate Environment Policy was released to employees and customers. Independent audits verified the continued compliance of SaskPower's Environmental Management System to the rigorous ISO 14001 Standard, and registration was confirmed.

Living waste heat from the Shand Power Station, SaskPower's Shand Greenhouse grew and distributed over 460,000 tree and shrub seedlings to not-for-profit agencies, service clubs, conservation agencies and individual land-owners interested in preserving and enhancing Saskatchewan's natural landscape. Interactive school presentations, tours and planting events were also organized, part of programming that reached over 3,000 students from more than 140 schools.

The new Green Power Portfolio was announced. It commits to further exploration and development in wind, small-scale Environmentally Preferred Power and customer-oriented energy conservation.

A $70-million project was completed at Boundary Dam Power Station that saw the installation of five new electrostatic precipitators and the upgrade of a sixth. Virtually all flyash is now captured from the generating units, ensuring the facility meets federal and provincial standards. During the year, SaskPower also continued research into innovative ways to burn coal more cleanly and evaluated potential technology options for carbon dioxide capture and storage.

WATROUS CIVIC CENTRE 1959

Together with the Saskatchewan Urban Municipalities Association and Saskatchewan Research Council, SaskPower launched a pilot project in Watrous, Saskatchewan, to determine options for financing and implementing a Community Energy Management Service for facilities.

The Corporation continued working with the provincial government, as well as municipal, school, and commercial customers, to upgrade heating, cooling, lighting and ventilation systems at their facilities. The Energy Performance Contracting (EPC) service is helping to lower greenhouse emissions, while resulting savings from reduced energy use pay for the capital costs of improvements. EPC retrofits that began at SaskPower's facilities in Regina during 2003 will eventually serve as a showcase for the program.

greenpower

SaskPower was able to make its GreenPower product — EcoLogo-certified electricity — more affordable by reducing the price by more than 25% as a result of the Government of Canada's Wind Power Production Incentive. In 2003, the amount of GreenPower available to customers was increased through an expansion of the Cypress Wind Power Facility. Seven wind turbines were added, bringing capacity at the location to 11 megawatts.

As part of the Corporation's distributed generation program, pilot projects were announced with private sector firms to utilize traditional waste by-products — such as wood residue and hog manure — to produce electricity. A new biogas facility utilizing a manure digester (pictured above) will be commissioned in 2004.

SaskPower supported a variety of community organizations specializing in environmental education and action, including: Ducks Unlimited Canada, Saskatchewan Environmental Society, Saskatchewan Wildlife Federation, Chaplin Nature Centre, Nature Saskatchewan and the Saskatchewan Association of Agricultural Societies and Exhibitions.

SaskPower International ATCO Power

SaskPower International — the Corporation's development arm — entered into a 50/50 joint venture with ATCO Power to expand SaskPower's wind generating capacity through an addition of 150 megawatts of zero-emission energy.

105-03934/

ABOUT US

SaskPower is the principal supplier of electricity in Saskatchewan and its mission is to deliver power in a safe, reliable, cost-effective and environmentally responsible manner. Founded as the Saskatchewan Power Commission in 1929, SaskPower was incorporated as a provincial Crown corporation in 1950 and operates under the mandate and authority of *The Power Corporation Act*. SaskPower operates three coal-fired power stations, seven hydroelectric stations, four natural gas stations and one wind facility with an aggregate generating capacity of over 3,050 megawatts (MW). The Corporation also has purchase agreements with the Meridian Cogeneration Station, Cory Cogeneration Station and SunBridge Wind Power Project. Total available capacity is approximately 3,500 MW. SaskPower maintains more than 152,000 kilometres of power lines, the most extensive network in Western Canada.

Generation Capacity (net MW)

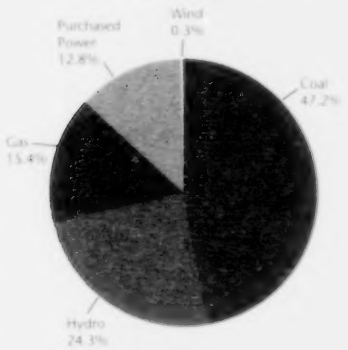
	2003	2002	2001	2000	1999
Coal	1,653	1,653	1,653	1,658	1,658
Gas	539	539	374	378	378
Hydro	853	853	853	853	853
Wind	11	6	-	-	-
Purchased power	449	221	221	221	221
Total	3,505	3,272	3,101	3,110	3,110

Transmission and Distribution Lines (pole km)

	2003	2002	2001	2000	1999
Transmission (72 kV - 230 kV)	12,104	12,026	12,290	12,388	12,335
Distribution (14.4 kV - 25 kV)	140,733	140,084	139,460	138,859	138,321

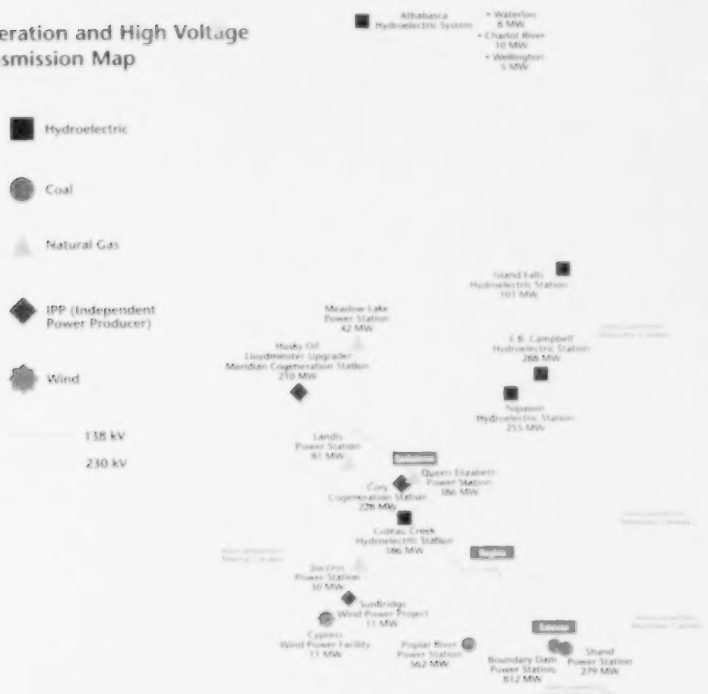
• Historically, line kilometres were estimated; the recent use of satellite mapping systems has resulted in more accurate data.

2003 Generation Capacity
(Net MW)

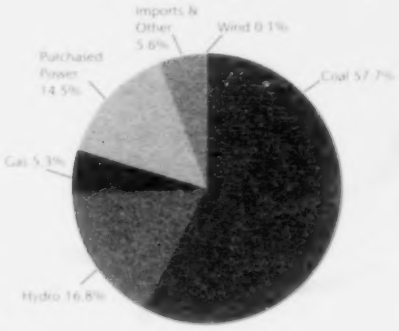


Total Generation Capacity: 3,505 MW

Generation and High Voltage Transmission Map


Hydroelectric
Coal
Natural Gas
IPP (Independent Power Producer)
Wind
138 kV
230 kV
Athabasca Hydroelectric System
Waterhen 6 MW
Charlot River 10 MW
Wellington 5 MW
Island Falls Hydroelectric Station 101 MW
Meadow Lake Power Station 42 MW
Husky Oil Lloydminster Upgrader Meridian Cogeneration Station 210 MW
E.B. Campbell Hydroelectric Station 288 MW
Tobin Lake Hydroelectric Station 253 MW
Landis Power Station 61 MW
Saskatoon
Queen Elizabeth Power Station 186 MW
Cory Cogeneration Station 279 MW
Coteau Creek Hydroelectric Station 186 MW
Regina
Success Power Station 30 MW
SunBridge Wind Power Project 11 MW
Cypress Wind Power Facility 11 MW
Poplar River Power Station 582 MW
Estevan
Boundary Dam Power Station 812 MW
Shand Power Station 279 MW

2003 Electrical Energy Generated
(Net GW.h)



Net Electrical Energy Generated: 20,326 GW.h

Words are only as effective as the intent and action behind them. At SaskPower, our commitment to environmental stewardship is clearly articulated. In 2003, our mission statement was revised and our obligation to ensure sustainability is central to the way the Corporation and our employees conduct business: "We deliver power in a safe, reliable, cost-effective and environmentally responsible manner."

Also updated during the past year, SaskPower's corporate Environment Policy provides a defined framework for our stated objective of protecting Saskatchewan's natural resources, systems and diversity. It contains eight areas of emphasis by which our customers and stakeholders can evaluate our progress: accountability, conservation, evaluation, goals, innovation, integration, partnerships and protection.

This Environment Policy is the heart of our Environmental Management System (EMS). SaskPower was the first Canadian utility to have its corporate-wide EMS achieve registration under the ISO 14001 Standard, and independent audits over the past 12 months have once again confirmed that we are meeting its demanding requirements. However, it is only through an emphasis on continual improvement that we will fulfill our responsibility to ensure long-term enhancement of our environmental performance.

Our success in achieving sustainability is significantly dependent on maintaining an open dialogue with both our employees and community. To that end, our 11th Environment Review allows us to not only reflect upon our achievements, but also to focus on areas requiring ongoing attention.

THE LANGUAGE OF ENVIRONMENTAL RESPONSIBILITY

As a utility that relies primarily on fossil fuel generation, one of SaskPower's most significant challenges is dealing with greenhouse gas (GHG) emissions. The recently-announced Green Power Portfolio is central to the strategy of ensuring Saskatchewan's new electricity needs up to 2010 are met using environmentally friendly sources without adding to GHG emissions.

We are concentrating on three areas of development: wind, small scale Environmentally Preferred Power, and customer-oriented energy conservation initiatives. During the year, our Cypress Wind Power Facility was expanded to 11 megawatts (MW) by adding seven turbines. Meanwhile, SaskPower International announced it is developing 150 MW of wind power in Saskatchewan. The project is a 50/50 joint venture with ATCO Power.

An initial call to the private sector for Environmentally Preferred Power projects received an encouraging response from 32 short-listed proponents involving nearly 170 MW of potential generation. In addition, distributed generation partnerships were announced for projects using waste by-products, such as wood residue and hog manure, to produce electricity. In 2003, we also built upon our energy conservation activities by launching a pilot project to retrofit community facilities.

Improvements at our own facilities are also at the core of our strategy. At Boundary Dam Power Station, we completed a $70-million project that involved the installation of five new electrostatic precipitators and upgrading the electrostatic precipitator on Unit #6. As a result, virtually all flyash emissions are now being captured.

New technologies are key in utilizing fossil fuels in a more environmentally efficient manner. To that end, SaskPower continued our support of the University of Regina's International Test Centre for Carbon Dioxide Capture, which includes a demonstration project at Boundary Dam Power Station. We also remain involved in national and international organizations: the Canadian Clean Power Coalition and Zero Emission Coal Alliance.

Within this publication you will find more information on SaskPower's environmental performance, including valuable industry benchmark reporting through the Canadian Electricity Association's Environmental Commitment and Responsibility Program Indicators. While much remains to be done to strengthen our sustainability efforts, I am encouraged by the growing efforts of our partners, customers and employees. Words are important, but it is our actions that will be remembered.

John Wright
President and Chief Executive Officer

ENVIRONMENT POLICY

SaskPower is committed to protecting the environment while providing our customers with safe, reliable and cost-effective sources of electricity.

Our Commitment to Environmental Responsibility

SaskPower has adopted the following principles to help safeguard Saskatchewan's natural resources, systems and diversity:

- Compliance with relevant environmental legislation, regulations and corporate environmental commitments
- Continual improvement of Environmental Management Systems
- Prevention of pollution

In keeping with these principles, SaskPower is committed to:

Accountability

Provide the public with an annual review of our environmental performance and environmental management programs.

Conservation

Implement the fundamentals of waste management: rethink, reduce, reuse, recycle and recover.

Evaluation

Audit our environmental performance regularly, including auditing for compliance with the ISO 14001 Standard for Environmental Management Systems.

Goals

Establish and maintain environmental objectives and targets.

Innovation

Identify opportunities for continual improvement and implement cost-effective, environmentally responsible technologies and improved management practices.

Integration

Integrate environmental considerations into all capital planning and purchasing decisions.

Partnerships

Ensure all employees and contractors are aware of and fulfill their environmental roles and responsibilities.

Protection

Identify, monitor and manage all significant environmental aspects associated with our operations and services.

A CONTINUING JOURNEY

At SaskPower, we recognize the power of sharing ideas, experiences, information and knowledge. We acknowledge the importance of collaboration amongst employees, customers, industry and community organizations along the path to sustainability. The following pages illustrate SaskPower's environmental achievements and challenges for 2003 and beyond, utilizing the eight areas of emphasis from our corporate Environment Policy as a framework for our reporting.

ACCOUNTABILITY

Provide the public with an annual review of our environmental performance and environmental management programs.

Our Environmental Management System

The Corporation's Environmental Management System (EMS) focuses on three key commitments:

- Compliance with relevant environmental legislation, regulations and corporate environmental commitments
- Continual improvement of Environmental Management Systems
- Prevention of pollution

In 2003, all of SaskPower's EMS registrations were successfully renewed to the International Organization for Standardization (ISO) 14001 Standard for Environmental Management Systems, following independent audits. This voluntary standard provides the framework for any organization that strives to "minimize harmful effects on the environment caused by its activities" and to "achieve continual improvement of its environmental performance." The key elements of the standard are policy; planning; implementation and operation; checking and corrective action; and management review.

Environmental Reporting

SaskPower's Environment Review allows the Corporation to annually communicate the information necessary to assist in gauging environmental performance. The indicators within this publication help to provide a picture of ongoing activities and issues.

The Canadian Electricity Association (CEA) has been a pioneer in developing standard indicators – used in SaskPower's Environment Review – to support its Environmental Commitment and Responsibility (ECR) Program. As a voluntary member of the ECR Program, SaskPower has adopted the program's core principles:

- To be more efficient in our use of resources
- To reduce the adverse environmental impacts of our business
- To be accountable to our constituents
- To ensure that our employees understand the environmental implications of their actions and have the knowledge and skills to make the right decisions

Using ECR Program indicators also allows SaskPower to benchmark with other Canadian utilities. See page 22 for detailed data.

Public Consultation

SaskPower is committed to working closely with a broad range of stakeholders concerning projects, facilities, operations and policies. Consulting with customers, communities and organizations ensures we achieve the best possible planning and implementation results.

A systematic process is in place to communicate with regulators, local officials, planners, customers, landowners, contractors, suppliers and other interested parties early in the planning stages of any project that will have a potential environmental impact. This approach allows SaskPower to identify public concerns and work toward mutually beneficial solutions. The results of public consultation programs are included in project applications and approval processes required by our regulators.

Governance

The Environment, Occupational Health and Safety Committee of the SaskPower Board of Directors plays a key role in guiding the Corporation's actions in the area of environmental responsibility. The Committee's roles include monitoring and reporting on legislative, regulatory and corporate standards; reporting on trends and public policy issues; reviewing emergency response procedures; and recommending policies and actions.

CONSERVATION

Implement the fundamentals of waste management: rethink, reduce, reuse, recycle and recover.

EnergyCheck

EnergyCheck, SaskPower's interactive home energy audit and information service, is available on-line at saskpower.com. In 2003, more than 2,700 HomeCheck on-line audits were completed, surpassing the original estimates of 1,000 audits per year. Since its inception, over 10,000 people have used the service. The program helps Saskatchewan residents pinpoint where they can conserve energy in their homes, allowing them to reduce greenhouse gas (GHG) emissions associated with their energy usage while saving money on natural gas and electricity bills.

HomeCheck Completed Audits

2003	2002	2001	TOTAL
2,752	4,033	3,507	10,292

Energy Performance Contracting

SaskPower's Energy Performance Contracting (EPC) service, a component of SaskPower Energy Solutions, assists our larger customers in lowering energy consumption. New energy efficient equipment and components are installed in existing facilities, with the savings from lower electricity, water and natural gas bills being used to pay for the retrofits. In 2003, EPC customers reduced their GHG emissions by 10,000 tonnes of carbon dioxide equivalent (CO_2e). During the past year, SaskPower initiated work on an energy management project for many of our buildings in the Regina region, including Head Office. When completed in 2004, the venture will serve as a showcase for future EPC customers.

In 2003, the Saskatchewan Valley School Division No. 49 completed most of the construction work to upgrade 18 schools and administrative facilities. Meanwhile, work was 95% completed on a program with the City of Regina to upgrade seven facilities. In addition, a project that began with the Saskatchewan Property Management Corporation (SPMC) in 2000 continued through 2003; SaskPower and SPMC have agreed to proceed with a feasibility study of an additional phase of retrofits. The Corporation continues to promote the EPC service to other school divisions, the provincial health care sector and private industry.

Community Energy Management Service

Watrous, Saskatchewan, was selected as the location for SaskPower's first Community Energy Management Service (CEMS) pilot project. The program, aimed at municipal customers with total energy costs less than $250,000 per year, will coordinate the installation of energy efficient lighting, motors and system controls in facilities such as ice rinks, community centres and municipal offices.

The pilot began with an energy audit, conducted by the Saskatchewan Research Council, to determine existing usage levels. The energy audit was vital in determining how facility operators can use the potential energy savings to offset the capital cost of installing energy efficient equipment. SaskPower will study the results of the Watrous project to determine whether there is support to expand the CEMS program province-wide.

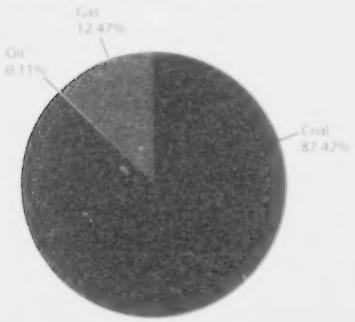
Fuel Consumption

SaskPower continues to rely on fossil fuels for the majority of our electrical generation. Gas and coal sources account for 63% of net electrical energy supplied in 2003. Of this, coal is consumed at a much greater rate than natural gas and accounts for more than 87% of the fuel consumed based on energy content. Future dependence on fossil fuels will be lessened through SaskPower's commitment to the Green Power Portfolio and its three areas of strategic focus: wind, small scale Environmentally Preferred Power, and customer-oriented energy conservation initiatives.

Net Electrical Energy Generated (GW.h)

	2003	2002	2001	2000	1999
Coal	11,730	11,670	11,711	11,436	11,551
Gas	1,066	989	798	924	995
Hydro	3,416	2,836	2,391	3,046	3,660
Wind	20	4	-	-	
Imports & other	1,142	1,431	2,127	1,995	1,484
Purchased power	2,952	1,769	1,691	1,691	146
Total	20,326	18,699	18,718	19,092	17,836

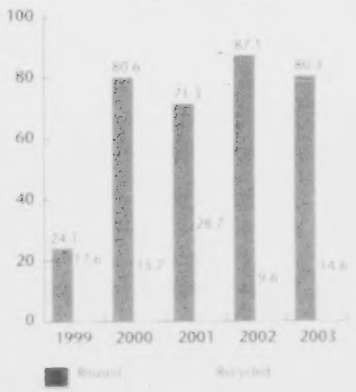
Fossil Fuel Consumption



Insulating Oil

Throughout our electrical grid, there are several kinds of electrical equipment that use oil as an insulator and coolant. As part of ongoing maintenance, most of this insulating oil is filtered or reprocessed so that it can be returned to serviceable electrical equipment. In 2003, SaskPower reused 80.3% of the insulating oil taken out of service – a volume of 1,098,689 litres. Reusing insulating oil reduces the purchase of new oil required for insulation, and limits the volume of oil disposed as waste. A smaller portion of oil removed from service is recycled for uses other than in electrical equipment. The remainder of the insulating oil taken out of service was disposed of properly.

Insulating Oil Reused and Recycled – %



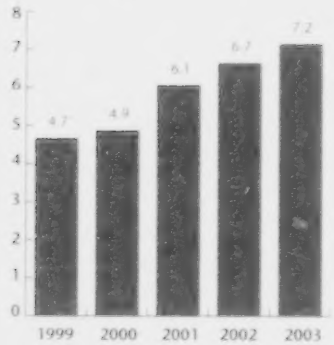
* In 1999, a significant portion of the existing inventory of insulating oil was sent to Swan Hills, Alberta, for reclamation.

Flyash Recycling

Flyash – a fine ash that is a by-product of burning finely pulverized coal in thermal power stations – is extracted from exhaust gases by electrostatic precipitators (ESPs). Some of the flyash collected is used for ready-mixed concrete, concrete block, pipe and paving stones, mine backfill, oil well cementing, road base stabilization and environmental remediation.

In 2003, SaskPower International continued to sell flyash to a Saskatchewan-based company involved in a provincial highway improvement project. Flyash is blended with other materials to strengthen thin membrane surface roads across the province. There are approximately 7,500 kilometres of these secondary highways in Saskatchewan.

Flyash Use – %

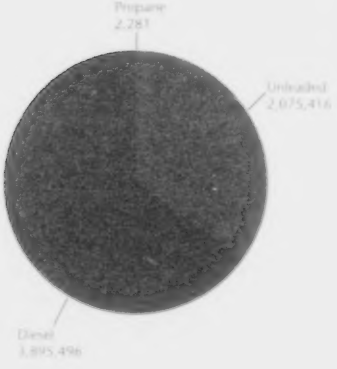


* Measurement of sales of this coal-fired generation by-product

Vehicle Fleet Management

In addition to investigating the feasibility of leasing electric hybrid vehicles, SaskPower Fleet Services is exploring the use of natural gas vehicles. Typically these units have been unpopular due to the lack of range between fuel fills and problems associated with performance. Improved technology in the fuel systems and a wider availability of filling stations is making the use of natural gas vehicles more attractive. In SaskPower's light duty fleet, the implications of using gasoline versus diesel fuels are also continually analyzed to maximize the best return both economically and environmentally.

Fuel Consumption by Vehicle Fleet – Litres



Zero G

The Zero G — zero garbage — Waste Management Program was introduced in 1993 at SaskPower to encourage employees to take individual environmental action. In 2003, paper recycling from corporate facilities in the Regina area, including Head Office, increased by 14% over the previous year; over 68,000 kilograms (kg) of paper were diverted from landfills. Employees continue to actively support additional recycling programs introduced to deal with sources of waste other than paper, including aerosol cans, oily rags, antifreeze, batteries, printer cartridges and organic material.

SaskPower supports public education focused on waste reduction. In cooperation with the City of Regina and the Saskatchewan Roughriders, the Green the Park Program promotes the recycling of plastic cups at Taylor Field. In 2003, an estimated 200,000 cups were recycled; approximately 80% of the total used.

The Corporation has also continued its partnership with the Regina and District Food Bank in the thINK FOOD Program. Over 3,100 laser and inkjet cartridges were provided to this Canada-wide recycling program during 2003 — the largest single contribution by a Saskatchewan business. This donation raised $4,456, enough to finance the purchase of approximately 1,587 kg of food.

EVALUATION

Audit our environmental performance regularly, including auditing for compliance with the ISO 14001 Standard for Environmental Management Systems.

Improving the Environmental Management System

With a view to continual improvement, effective and ongoing evaluation of our EMS is essential in order to maintain the system's integrity and accuracy. The process includes consistent monitoring and measurement of the Corporation's environmental performance. Results are reported in our annual Environment Review, the Voluntary Challenge Registry (VCR), the National Pollutant Release Inventory (NPRI) and the CEA's ECR Program report.

Auditing

SaskPower's EMS is subject to both internal and external evaluation. Internal audits, a required element of the ISO 14001 Standard, are conducted annually at every registered unit by objective and qualified SaskPower personnel. External audits are also conducted annually by the Quality Certification Bureau (QCB), an international quality and environmental management systems registrar. The findings and recommendations of internal and external audits, as well as our monitoring and measurement results, are used to identify and prescribe any corrective and preventative actions.

Site Assessments

SaskPower conducts site assessments prior to the sale, purchase or lease of property, or as a result of investigations indicating the potential for contamination. If necessary, we initiate site remediation after the assessment has been completed.

Gull Lake District Service Building

The District Service Building in Gull Lake was the site of a diesel-fuelled power station. A site assessment of the building and property identified petroleum hydrocarbons above acceptable criteria in the soil and within the groundwater layer. An underground storage tank was also found below the concrete floor in the building. A proposal to decommission the tank has been submitted to Saskatchewan Environment. Further testing will be conducted at the site.

Paradise Hill Town Substation

A site assessment at the former town substation in Paradise Hill identified petroleum hydrocarbons and chromium in the surface soils that were above acceptable criteria. A clean-up plan was approved by Saskatchewan Environment and involved excavating the petroleum hydrocarbon-contaminated soil and placing it in the City of North Battleford landfill for landfarming. The chromium-contaminated soil was combined with the petroleum hydrocarbon-contaminated soil prior to transport to the North Battleford landfill.

Rosthern District Service Building Property

A diesel-fuelled power station was located on the former Rosthern District Service Building property. A preliminary assessment of the site identified excessive concentrations of petroleum hydrocarbons in the subsurface soil at a number of locations on the property, as well as at one location on the adjacent road allowance. Delineation of the contamination in the soil and assessment of the impacts on the groundwater are planned for 2004.

Saskatoon Service Centre

In Saskatoon, a building and storage yard previously used to manufacture and store fibre optic cable were being considered as the site for a new service centre. Based on the results of a preliminary site assessment by SaskPower, a consulting firm was contracted to complete a Phase I & II Environmental Site Assessment prior to the purchase of the property. No significant environmental concerns were identified, and the property was purchased.

Shand Construction Area

A Phase I Environmental Site Assessment has been completed on a property near the Shand Power Station that was used for the construction of the power station in the early 1990s. The assessment did not identify any significant environmental concerns related to the use of the property.

Shellbrook District Warehouse

The district warehouse site in Shellbrook once housed a diesel-fuelled power station. Testing of the groundwater has found that the concentrations of specific phenols were all within the guidelines for the protection of human health. However, some of the samples contained concentrations of two specific phenols that exceeded the aesthetic objectives applicable to potable water, meaning that they could impart a taste or odour to the water. Because these particular water quality objectives do not apply to groundwater sources, it was determined that no further monitoring is necessary.

Yorkton Service Centre

A diesel-fuelled power station was situated on the Yorkton Service Centre property. Previous site assessments identified concentrations of petroleum hydrocarbons exceeding criteria in the subsurface soil and shallow groundwater on the property, as well as on adjacent properties to the west and north. Concentrations of certain metals exceeding guidelines were found in the soil and groundwater on the property. Although the risks were low, further assessment was warranted at a few locations where liquid phase hydrocarbons were found. Testing indicated that it would be impracticable to remove the liquid phase hydrocarbons because the volumes are too small. Monitoring of the groundwater indicated no appreciable change in the extent of contamination. Monitoring will continue in 2004.

Other Assessments

Eight properties were assessed prior to being released for sale or returned to the lessor, including substations, warehouses and offices. Soil samples collected at the properties were analyzed for polychlorinated byphenyls (PCBs), hydrocarbons, metals, and where necessary pentachlorophenol (PCP), creosote, and herbicides. The assessments identified four sites that require remediation before the properties can be released. These four sites, as well as two substations that were assessed in 2002, are scheduled for remediation in 2004. In addition, 14 properties were assessed prior to finalizing the lease or purchase agreements and four other assessments related to new construction were completed on existing SaskPower property.

GOALS

Establish and maintain environmental objectives and targets.

Setting Goals for Achievement

Based on internal and external audits, as well as management review, key environmental objectives have been established by the Corporation. These are rooted in regulatory, technological and financial considerations, as well as the views of customers, communities and environmental agencies.

The following table represents significant examples of targets and resulting actions:

Objective	Scheduled completion	Status	Result
Investigate fish stranding at the E.B. Campbell Hydroelectric Station and develop a fish salvage strategy following spilling	2003	Complete	The investigation was concluded. As a result, an action plan will be developed and submitted to the federal Department of Fisheries and Oceans.
Reduce nitrogen oxide (NO_x) emissions at the Poplar River Power Station	2003	Complete	Reduced NO_x emissions by over 10% below average historic emissions. Target was met through the installation of low NO_x burners in Unit #2 in 2002 and by operating at the optimal level of oxygen (O_2) to reduce the formation of NO_x.
Decrease soil salinity due to the operation of the Cookson Reservoir, adjacent to the Poplar River Power Station	2003	In progress	A program of pumpwell rehabilitation has been introduced to lower the water table by pumping water from the surrounding area back into the reservoir.
Reduce particulate matter air emissions from the Boundary Dam Power Station	2003	Complete	Due to the installation of electrostatic precipitators, particulate emissions have dropped by over 95% since 1998.
Minimize impacts on fish at Queen Elizabeth Power Station	2003	In progress	A study assessing the impacts on fish was conducted and fish screening improvements are underway.
Reduce airborne pollutants from the Queen Elizabeth Power Station	2003	In progress	Installation of an oil mist eliminator minimized emissions. The increased use of combined cycle units have lowered NO_x emissions by 22% from 2002 levels.
Solidify a process to identify hazardous wastes handled by Transmission & Distribution	2003	In progress	The creation of a comprehensive list of Transmission & Distribution products that are commonly considered to be dangerous goods, as well as descriptions of their associated hazards, is complete. A list of certified waste disposal companies will be developed by the end of 2004.

INNOVATION

Identify opportunities for continual improvement and implement cost-effective, environmentally responsible technologies and improved management practices.

Environmentally Preferred Power

As part of the Green Power Portfolio, SaskPower has adopted a strategy to meet load growth over the next several years without creating new GHG emissions. Environmentally Preferred Power (EPP) will play a significant role in achieving this ambitious goal. In September 2003, the Corporation issued our first Expression of Interest for up to 15 megawatts (MW) of EPP from the private sector, with eligible technologies including flare gas, wind, low-impact hydro, biomass, biogas, heat recovery from an existing waste heat source, and solar.

SaskPower plans to announce the selection of the first set of EPP projects by the summer of 2004. These are expected to be in service in 2005. Solicitations for additional projects will continue annually until 2005.

150-MW Saskatchewan Wind Power Project

In 2003, SaskPower International announced it is developing 150 MW of wind power generation in Saskatchewan. The project is a 50/50 joint venture with ATCO Power. When fully operational, it is expected to produce about 500 million kilowatt-hours (kW.h) of energy annually — enough for about 64,000 homes. During the past year, analysis of wind speeds and consistency were undertaken to identify the best sites.

GreenPower

SaskPower's GreenPower product provides customers with the opportunity to support the development of EcoLogo-certified renewable energy in Saskatchewan. Available since April 2002 to all SaskPower customers, sales of GreenPower continued to grow through 2003. Purchasing a 100 kW.h block of GreenPower per month provides the same positive environmental impact as planting 200 trees over the course of a year.

The Cypress Wind Power Facility and the SunBridge Wind Power Project — both located in southwestern Saskatchewan — supply about 22 MW of GreenPower to the province. The Government of Canada, Government of Saskatchewan, SaskTel, SaskEnergy, University of Regina and Hitachi Canada have all made commitments to purchase GreenPower, while SaskPower is using the product to meet the equivalent of all the energy needs for our Head Office.

Distributed Generation

The process of producing electrical power on a small scale at a customer's site is known as distributed generation. In addition to generating power closer to where it is actually used — which increases efficiency by cutting power line losses — distributed generation also allows SaskPower to test the feasibility of various renewable generation technologies.

SaskPower has formed a partnership with the Zelensky Brothers Sawmill to construct a facility near La Ronge that will turn wood residue into heat and electricity. The Saskatchewan

Research Council has reported there is the potential to generate 65 MW of electricity in Saskatchewan from this type of process based on the residue production available in the province.

SaskPower has also partnered with Clear-Green Environmental Inc. to develop a project that will create biogas from a manure digester, located at a hog facility near Cudworth, Saskatchewan. SaskPower is supplying microturbine units that will use the biogas to generate 120 kilowatts (kW) of electrical energy. The project will be commissioned in 2004.

In 2003, SaskPower continued the operation of three other distributed generation pilot projects: a partnership with SaskEnergy and Flatland Exploration using flare gas from oil wells to generate electricity; a partnership with the Regina Qu'Appelle Health Region and SaskEnergy on a cogeneration development at the Regina General Hospital; and a solar power distributed generation project at the Saskatchewan Science Centre. The Corporation is also investigating the feasibility of using methane from landfill sites to create electrical energy.

Clean Coal Research

SaskPower participates in several initiatives exploring the feasibility of eliminating the emissions that result from burning coal to generate electricity. The Corporation is a founding member of the Canadian Clean Power Coalition, a consortium of utilities seeking innovative ways to burn coal cleanly. The group is working on evaluating technology options and finalizing cost estimates for the construction of a demonstration plant.

The University of Regina's International Test Centre for Carbon Dioxide Capture is focused on developing amine scrubbing technologies that would remove carbon dioxide ($C0_2$) from coal combustion emissions. SaskPower hosts a demonstration project for this technology at Boundary Dam Power Station. A recent achievement recorded by the centre was a reduction in the energy input required for $C0_2$ capture.

SaskPower is also part of the Canada Centre for Mineral and Energy Technology (CANMET) CO_2 Consortium. This partnership is using the laboratories of Natural Resources Canada to perfect an oxy-fuel process for the capture of $C0_2$. The consortium is also researching technologies for the capture of mercury from lignite coals.

The Weyburn Carbon Dioxide Monitoring Project is a joint research undertaking with the International Energy Agency and EnCana. $C0_2$, recovered from a gasification plant in North Dakota, is injected into the ground for enhanced oil recovery. The large monitoring program documenting baseline information makes this the best-monitored $C0_2$ injection project in the world.

In addition, SaskPower is participating in the Zero Emissions Coal Alliance (ZECA), which is developing a hydrogen-based technology to eliminate emissions from coal-fired electricity generation. The Corporation is also involved in several smaller scale studies, including the investigation of $C0_2$ sequestration sites in Saskatchewan and research into additional emissions control technologies.

Small Power Producers Policy

A growing number of customers are approaching SaskPower as they investigate ways to generate their own electricity in an environmentally responsible way. Wind and solar-powered installations are typical examples often considered when evaluating the feasibility of self-generation. To respond to these inquiries, SaskPower has established a Small Power Producers Policy. It outlines the requirements for electricity generators which are interconnected to the Corporation's electric system. With two-way metering installed, SaskPower will purchase surplus power at our variable cost of electricity.

Energy Efficiency

The economical use of energy and resources in the operation of our facilities is an important factor in reducing our overall impact on the environment. The 228-MW Cory Cogeneration Station — a 50/50 joint venture between SaskPower International and ATCO Power — began commercial operations in January 2003. It dramatically increased the amount of cleaner burning gas turbine generation in the SaskPower fleet. Since cogeneration plants are much more efficient than simple cycle plants, this is helping to improve our energy conversion efficiency.

The Corporation's generation efficiency was also improved in 2003 through the addition of seven wind turbines (0.66 MW each, totaling 4.62 MW) at the Cypress Wind Power Facility. At Boundary Dam Power Station, the major overhaul of Unit #6 is expected to increase efficiency in future years.

Internal Energy Efficiency - %

	2003	2002	2001	2000	1999
Generation	94.3	93.6	93.3	93.6	93.9
Transmission	95.8	95.2	95.4	95.0	95.1
Distribution	95.3	94.8	95.0	94.4	94.6

• Measurement of the amount of electricity that is used for station service and supporting infrastructure, as well as line losses from transmission and distribution systems, excluding purchased power.

Energy Conversion Efficiency of Fossil Generation - %

2003	2002	2001	2000	1999
30.7	30.3	31.5	31.3	30.1

• Measurement of how much of the energy released in burning fossil fuels (like natural gas and coal) is turned into electricity.

INTEGRATION

Integrate environmental considerations into all capital planning and purchasing decisions.

Screenings, Assessments and Project Approvals

As part of SaskPower's ongoing commitment to sustainable development and compliance with all relevant legislation, the Corporation continually conducts internal screenings of our generation, transmission and distribution projects. If there is any probability that environmentally sensitive lands, habitats or species will be affected by development, project plans are forwarded to SaskPower Environmental Programs for assessment in detail. The assessment may determine that legal approvals and permits are required, the development area in whole or in part must be field inspected, an environmental protection plan must be implemented, or that other actions are required. In 2003, a total of 337 projects were forwarded to Environmental Programs.

Major Projects

During 2003, a new transmission line was proposed for construction from **Kindersley to Marengo** 1, in order to reinforce energy supply for the oil and gas industry in the region. SaskPower worked closely with the local landowners to position the right-of-way to minimize impact on farming practices. Environmental approval to construct the line was granted by the provincial regulator in December.

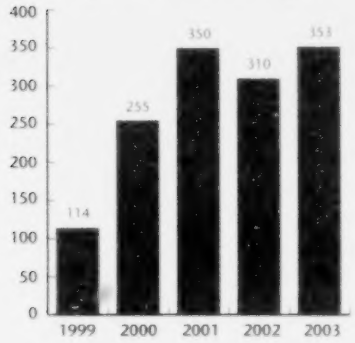
The final portion of the **W2T Stage One** 2 (formerly known as PA8 Stage One) 72/138 kilovolt (kV) transmission line near Christopher Lake was completed in the fall of 2003, along with a new substation at Timber Cove. The project greatly improves the reliability of electricity supply to La Ronge and the surrounding region. Environmental monitors worked closely with project designers and construction crews to minimize impacts. The right-of-way will be assessed for reclamation requirements in the summer of 2004.

The **W2T Stage Two** 2 (formerly known as PA8 Stage Two) transmission line was built in 2003. This is a short transmission line extending from Highway 55, northeast of Prince Albert, for about four kilometres, where it connects to an existing power line. The line was needed to bring the voltage of the newly-completed W2T Stage One transmission line up to 138 kV capacity, and has improved service northward as far as Timber Cove. By building the new line along an existing provincial road, environmental impacts were minimized.

In 2003, the last segment of the rebuild of a transmission line between Green Lake and Beauval, **ML3 Stage 3** 3, was completed. SaskPower and environmental monitors worked closely with local residents, Saskatchewan Environment and construction personnel to ensure the line was built with low environmental impact.

With respect to generation, environmental approvals were obtained for an expansion of the Cypress Wind Power Facility. Seven additional turbines were built west of Swift Current at the **Moore Creek** 4 site, approximately 1.6 kilometres east of the turbines erected in 2002. Impact on the natural environment was minimized, as all turbines were built on cultivated land.

Project Referrals in Progress



* Referrals in progress includes projects referred in previous years.

Project Referrals and Field Assessments

	Referrals	Assessments
Generation	3	2
Transmission	8	10*
Distribution	326	37*
Total	337	49*

* Includes fieldwork conducted in 2003 for projects referred to Environmental Programs in previous years.

Major Projects

SaskPower Shand Greenhouse

Shand Greenhouse is a wholly-owned subsidiary of SaskPower and is one of the Corporation's most visible environmental assets. The very design and purpose of the greenhouse reflects the facility's environmental education and conservation mandate within SaskPower.

The greenhouse harnesses waste heat produced by the adjacent Shand Power Station and uses it to grow hundreds of thousands of tree and shrub seedlings annually. In 2003, the distribution of over 460,000 trees, shrubs, grasses and forbs brought the total supply since the greenhouse opened in 1991 to 3.8 million seedlings. These have all been distributed to the greenhouse's partners — school groups, conservation organizations and individuals — who are interested in protecting and enhancing Saskatchewan's environment.

Greenhouse staff also deliver the Energy and Our Environment Program to school children across the province. The interactive presentation explains how the production and use of electricity impacts the environment. Most importantly, it also communicates what students can do to make a personal difference by reducing their use of electricity. In 2003, SaskPower staff made 64 Energy and Our Environment presentations to schoolchildren in grades five and six across the province.

The Energy and Our Environment Poster Contest complements the presentation by inviting school children to visually articulate their ideas on how they can reduce their impacts on the environment. Over 400 posters were received in 2003, and winning entries were selected from four different areas in the province.

Constructed Wetland

SaskPower operates a constructed wetland near Estevan that provides cooling water to the Shand Power Station by naturally purifying the City of Estevan's secondary sewage wastewater. One of a handful of constructed wetlands in North America, the natural processes occurring at the location have eliminated the need for semi-annual releases of Estevan's lagoons to the environment. Constructed adjacent to the wetland, a 117-hectare pond provides marsh habitat for various species of wildlife and migratory waterfowl. In 2003, work began on enhancing public education opportunities, with the development of a series of interpretive signs at the wetland site.

Procurement

Environmental considerations are integrated into everyday operations and decision-making throughout SaskPower. The Corporation has guidelines related to the procurement of environmentally appropriate products. As well, contractors providing goods or services to SaskPower are subject to the conditions of our Environmental Management System (EMS).

Vegetation Management

SaskPower manages vegetation along power line rights-of-way. By using integrated vegetation management practices to promote the development of low-growing vegetation, we reduce the possibility of fires, damage to the transmission and distribution system, and interruptions to electrical service.

SaskPower uses a variety of strategies to remove tall vegetation along transmission and distribution line rights-of-way, while also encouraging the establishment of plant species that provide important wildlife habitat. Mechanical methods, seeded and naturally occurring native vegetation, and selective herbicides form the basis of our management program.

PARTNERSHIPS

Ensure all employees and contractors are aware of and fulfill their environmental roles and responsibilities.

Environmental Awareness Training

In compliance with the ISO 14001 Standard, each SaskPower employee must complete environmental awareness training every three years. Training is available on-line or in a classroom format, and provides an overview of the EMS while highlighting the responsibilities of each employee.

Environmental Training for Employees

	2003	2002
Generation	247	211
Transmission & Distribution	433	390

Destination Conservation

SaskPower contributes more than $200,000 annually to support community non-profit organizations across the province that are involved in environmental initiatives. The Corporation is a key sponsor of the Destination Conservation Program. Delivered in schools across the province by the Saskatchewan Environmental Society, Destination Conservation is student-driven and activity-based, with an emphasis on environmental awareness and energy conservation. It promotes sustainability by helping schools conserve resources and protect the environment, and is an integral part of SaskPower's EPC service for Saskatchewan school divisions.

Ducks Unlimited

SaskPower is a Diamond Legacy sponsor of Ducks Unlimited Canada in Saskatchewan. Ducks Unlimited's habitat work and research projects are on the cutting edge of today's conservation efforts. Through our partnership, wildlife habitat and research programs have been developed across the province, ensuring the availability of not only more habitat for wildlife, but also additional recreational space and enhanced education for Saskatchewan people.

In 2003, Ducks Unlimited delivered the Saskatchewan Wetland Education Program, which includes presentations and field trips. Over 6,500 children and more than 800 adults participated. Meanwhile, the Winter Cereal Core Grower Program is continuing to encourage the sowing of winter wheat, a crop that provides excellent nesting habitat for waterfowl. Also, through Ducks Unlimited's South Saskatchewan Rangeland Stewardship Program, grazing management practices are being maintained or improved in high waterfowl producing areas of southern Saskatchewan.

Chaplin Nature Centre

In 2003, SaskPower provided financial and technical support to the Chaplin Nature Centre in order to assist in promoting conservation and showcasing the wetlands and shorebirds of the area. The Corporation contributed to the purchase and installation of a web cam and video equipment for the interpretive display area, as well as the solar panels required to power the equipment.

The Chaplin Nature Centre already draws birders from around the world; in a bid to encourage more international visitors, the Centre's website will provide live, real-time visuals of shorebirds through the web cam located on the lake. The system will enable people to see first-hand the migratory bird activity in the area.

PROTECTION

Identify, monitor and manage all significant environmental aspects associated with our operations and services.

Particulate Air Emissions

Through a partnership first forged with Saskatchewan Environment in 1998, SaskPower has been able to prioritize targets based on an assessment of the most critical environmental issues. One of the key outcomes of this partnership was a five-year, $70-million initiative to install electrostatic precipitators (ESPs) on five generating units and upgrade the existing ESP on Unit #6 at Boundary Dam Power Station, our largest coal-fired generating station. Work on this project was completed in 2003. Particulate emissions have dropped by over 95% since 1998, and with all ESPs operating on a continuous basis are estimated to drop another 50% in 2004 from 2003 values.

Greenhouse Gas Management

In support of environmental stewardship and as part of the Corporation's risk management strategy, SaskPower has been actively involved in GHG emission mitigation since the late 1980s. The Corporation adopted a voluntary strategy in 1999 that called for the acquisition of GHG offsets to help meet a GHG emissions reduction requirement. Offsets are a means for GHG emitters to reduce net CO_2 from the burning of fossil fuels by compensating with emission reductions at locations other than the emitters' facilities. This method of management is recognized as environmentally and economically effective by the Kyoto Protocol.

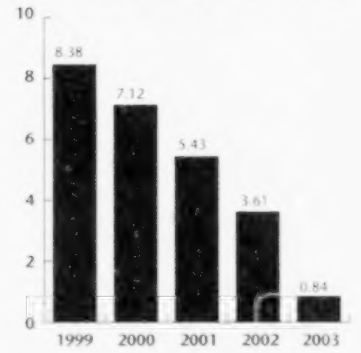
SaskPower's voluntary strategy directed the Corporation to invest in a sufficient amount of GHG offsets so that SaskPower would be 20% of the way toward reducing its 2008 to 2012 emissions to 6% below 1990 levels. Achieving that target required the acquisition of 6.5 megatonnes (Mt) of GHG offsets. Anticipated to be attained by the end of 2003, the target was based on the state of climate change policy development at the time, as well as an assumption that by the end of 2003, Canadian federal policy dealing with GHG management would be highly developed. SaskPower has made several significant offset investments directly relating to the strategy. However, in light of continued policy uncertainty at the federal level, SaskPower has chosen to not make further large-scale investments in GHG offsets until the rules and accounting processes are clarified. The Corporation will, however, continue its close monitoring of climate change policy development.

Outside of GHG offsets, SaskPower is actively involved in finding technological solutions to reducing GHG emissions. The Corporation funds research and development efforts and continues to find ways to improve the efficiency of existing facilities. Meanwhile, through the new Green Power Portfolio, SaskPower has committed to ensure that all of Saskatchewan's new electricity needs until 2010 are met without any additional GHG emissions.

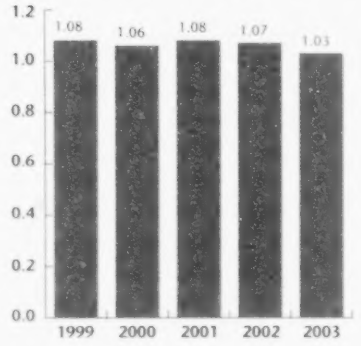
Air Quality

The emission of substances such as sulphur dioxide (SO_2), nitrogen oxides (NO_x) and particulate matter also contribute to environmental concerns, such as acid rain and smog. We are working closely with federal and provincial regulators to ensure that strict guidelines and standards for impacts on air quality are met.

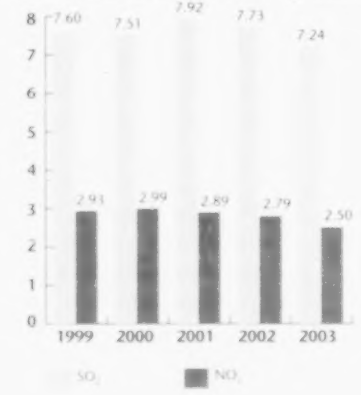
Particulate Emissions Per Unit of Fossil-based Generation – g/kW.h



Net Carbon Dioxide (CO_2) Emissions Per Unit of Fossil-based Generation – kg/kW.h



Net Emissions Per Unit of Fossil-based Generation – g/kW.h



Notes to emissions graphs

- The Cory Cogeneration Station is a 50/50 joint venture between SaskPower International and ATCO Power. Power is purchased by SaskPower as an independent power purchase and not treated as part of SaskPower's generating capacity. The entire net generation from Cory in 2003 of 1,233 GW.h was purchased by SaskPower. However, because the facility is jointly owned by SaskPower International, 50% of the emissions and generation are included as part of SaskPower's output.
- In 2003, the methodology to calculate emissions was modified, resulting in revisions to historical emissions data.

CO_2 Storage and Offsets

In the absence of a formal GHG offset policy in Canada, SaskPower has continued to make progress on two important projects. SaskPower and Saskatchewan Environment continue their collaboration on an innovative forest carbon sequestration plan that will result in the Corporation purchasing 22 Mt of CO_2 offsets from Saskatchewan Environment over a 50-year period. In 2002, the Greenhouse Emissions Reduction Trading pilot endorsed the undertaking, providing an objective third party review of the project's viability. SaskPower is also a participant in two Greenhouse Emissions Management Consortium (GEMCo) projects. GEMCo is a not-for-profit Canadian corporation demonstrating industry leadership in developing voluntary and market-based approaches to GHG emissions management. SaskPower has invested in offsets resulting from a landfill gas recovery project in Surrey, British Columbia, and a geological storage of CO_2 project in Texas.

PCB Management

PCBs are a group of organic compounds that were used as cooling and insulating fluids in various types of electrical equipment. Due to the potential adverse effects if released into the environment, PCBs require special handling, storage and disposal measures. Once removed from service, contaminated equipment is sent for approved disposal as PCB waste. Other PCB-generated waste is associated with spills and the handling of PCB contaminated materials. SaskPower tracks waste contaminated with 5 parts per million (ppm) PCBs or more. We use our regional storage sites to consolidate PCB waste prior to disposal. Refer to the CEA indicators (page 22) for quantities of PCBs in storage and sent for destruction.

Spills

Current legislation requires that spills of hazardous substances be reported to Saskatchewan Environment. Legislation defines a spill by type, volume and location. SaskPower had 14 reportable spills in 2003. The impact of all spills was either negligible, mitigated as appropriate or will be mitigated in the future upon decommissioning.

Reportable Spills - Number

	2003	2002	2001	2000	1999
Oil spills	5	10	4	9	5
PCB contaminated oil spills(≧5PPM)	5	7	5	7	9
Other spills	4	5	3	7	5
Total spills	14	22	12	23	19

Reportable Spills - Volume

	2003	2002	2001	2000	1999
Oil (litres)	1,180	2,957	974	7,388	1,045
PCB contaminated oil (litres)	67	139	93	565	217
PCBs (grams)	2.4	1.6	1.3	15.7	9.0

Electric and Magnetic Fields

Since the early 1970s, the scientific community worldwide has been studying the potential health effects of electric and magnetic fields (EMF). To date, a causal link between long-term health effects and low levels of EMF has not been established. SaskPower recognizes the concerns of our customers and employees regarding possible EMF-related biological and health effects. As a member of the Canadian Electricity Association, we actively monitor worldwide developments in scientific research, regulations and policy. We communicate balanced, accurate and timely information to all employees, customers and regulatory agencies regarding concerns related to health effects, computer monitor interference and property values. Upon request, our regional staff will take EMF measurements in both the home and workplace.

Reclamation

The final reclamation work along the W2T Stage One (PA8 Stage One) transmission line in the provincial forest adjacent to Highway 2 near Waskesiu, Saskatchewan, was completed in the fall of 2003. Due to drought conditions the previous year, about 20% of the right-of-way had to be revegetated with native grass and rose seedlings. Vegetation in the remainder of the right-of-way has successfully taken root, and contains a good variety of wild flowers, grasses and shrubs. Revegetation along parts of a new 138 kV transmission line north of Macklin, located on very sandy soils, incorporated native rose seedlings grown by the SaskPower Shand Greenhouse. The roses, which are somewhat drought resistant, are expected to better survive cattle grazing and stabilize the sandy soils than would an exclusive application of grass seed. The success of the reclamation will be evaluated in the spring of 2004.

Environmental Studies

Wind Power Raptor Mortality Study

In 2003, independent researchers concluded that the Cypress Wind Power Facility poses very little risk to birds and bats. From April to November, all bird and potential bird interaction with the turbines was recorded; consideration was also given to potential scavenging by predators. The study found no bat mortality, and two horned lark deaths. In its conclusions, the study noted that the design of Cypress — with visible, solid towers and slow-turning blades — allows birds to more easily adjust their flight and foraging patterns.

Transmission Line Cowbird Study

The W2T Stage One (PA8 Stage One) transmission line cowbird study continued in 2003, with the first post-construction data collected. The study is evaluating potential cowbird parasitism, where cowbirds lay eggs in the nests of songbirds, leading to the death of songbird chicks. Analysis found that cowbird interaction with the power line was extremely low. Research into the impact of cowbirds on the local songbird populations will continue through 2005.

Impacts on Fish at Queen Elizabeth Power Station

In cooperation with the federal Department of Fisheries and Oceans (DFO), SaskPower undertook a study to assess the potential impacts on fish in the Saskatchewan River at the Queen Elizabeth Power Station (QEPS). A concern was identified that QEPS's water filtration screens, which are designed to remove debris from the water, may allow small fish to pass into the plant's cooling water system and injure larger fish. Studies conducted between March and October 2002 found that few fish are caught or enter into the cooling water system at QEPS. Final results from the study were reported in 2003 and DFO was satisfied that impacts were much less than predicted.

The Saskatchewan River Sturgeon Management Board

For over 85 years, sturgeon formed the basis of a commercial fishery in the north. Today, they still serve as a traditional food source for Aboriginal people. The construction and operation of the E.B. Campbell Hydroelectric Station altered the sturgeon's river habitat. Starting in 1993, in response to local concerns, SaskPower funded a four-year study of this population of sturgeon. When it became evident that the sturgeon's long-term survival could only be addressed through inter-provincial cooperation, the Saskatchewan River Sturgeon Management Board (SRSMB) was established in 1998. As a founding member, SaskPower supports the SRSMB's ultimate goal of a self-sustaining sturgeon population in the Saskatchewan River that will meet the needs of local Aboriginal people in the future.

Dissolved Oxygen at Nipawin Hydroelectric Station

Fish and other aquatic organisms depend on the availability of dissolved oxygen in water. SaskPower monitors the tailrace (outflow of the water from the dam) at the Nipawin Hydroelectric Station (NHS) to ensure dissolved oxygen levels are within the acceptable range for the aquatic species downstream from that facility. Since monitoring began in 1991, levels have rarely been found to be outside of provincial guidelines. In addition, extensive downstream monitoring has confirmed minimal impacts on aquatic species below NHS.

Temperature Monitoring in the Boundary Dam Reservoir

In 2002, higher than expected temperatures were recorded by SaskPower personnel in the reservoir that provides cooling water to Boundary Dam Power Station. A field survey conducted in 2002 found that the upper temperature tolerances for the six species of fish in the reservoir are greater than the highest temperatures recorded during the study. A dissolved oxygen study conducted at the same time noted that dissolved oxygen levels were excellent throughout the reservoir. The final report for this project was completed in 2003 and was well received by both Saskatchewan Environment and DFO.

Impact of Maintenance of Hydroelectric Stations on Fish

Because of the reduced water flows during maintenance at SaskPower's northernmost hydroelectric stations — Wellington, Waterloo and Charlot River — SaskPower is working with DFO to assess the scope of impact on downstream fish habitat. The collaboration will also include a review of alternative means for managing impacts on fish habitat, such as adjusting maintenance schedules to not overlap with spring or fall spawning periods, and making preparations to move fish from affected areas if and when needed.

Mitigation at E.B. Campbell Hydroelectric Station

SaskPower is actively working to identify measures to reduce the potential impacts of spilling on aquatic life. Spilling describes the release of water through the spillway instead of through turbine units. The situation at E.B. Campbell is unique; rather than a conventional spillway directly below the dam, the station's spillway is a five-kilometre channel that extends northwest of the power canal. With the assistance of external experts, SaskPower is developing a plan to return fish to the river if the spillway must be used.

Piping Plover

The shores of Saskatchewan lakes provide critical habitat for piping plovers, an endangered species of shorebird. Lake Diefenbaker, at the site of SaskPower's Coteau Creek Hydroelectric Station, is one of the most important breeding sites in North America. SaskPower is a member of the Prairie Piping Plover Recovery Team and a participant in the Lake Diefenbaker Conservation Plan. All partners in the plan are committed to conserve breeding habitat and increase plover productivity through activities such as water level management, predator enclosures for nest protection, a volunteer guardianship program to reduce human disturbance, and limiting cattle shoreline access during the birds' breeding season.

INDICATORS

Canadian Electricity Association (CEA) Environmental Commitment Responsibility (ECR) Program

The CEA ECR Program reports industry-wide on efficiencies and environmental impacts. CEA ECR Program data for 2003 was not available at time of printing. SaskPower produces approximately 3% of the total generation created by all members of the CEA.

1. EFFICIENCIES - %	2003 SaskPower	2002 SaskPower	2002 CEA	2001 SaskPower	2001 CEA	2000 SaskPower	2000 CEA	1999 SaskPower	1999 CEA
Internal energy efficiency [A]									
Generation	**94.3**	93.6	97.5	93.3	97.5	93.6	97.4	93.9	97.3
Transmission	**95.8**	95.2	96.0	95.4	96.0	95.0	95.8	95.1	95.7
Distribution	**95.3**	94.8	95.8	95.0	95.8	94.4	95.4	94.6	95.1
Energy conversion efficiency for fossil-based generation	**30.7**	30.3	33.6	31.5	34.5	31.3	33.4	30.1	33.2
Flyash use [B]	**7.2**	6.7	24.8	6.1	24.8	4.9	21.5	4.7	20.6
Insulating oil reuse [C]	**80.3**	87.1	74.3	71.3	77.7	80.6	77.2	24.1	69.6

2. REDUCTION OF ENVIRONMENTAL IMPACTS	2003 SaskPower	2002 SaskPower	2002 CEA	2001 SaskPower	2001 CEA	2000 SaskPower	2000 CEA	1999 SaskPower	1999 CEA
Net emission of carbon dioxide per unit of net fossil generation (kg/kW.h) [D]	**1.03**	1.07	0.89	1.08	0.83	1.06	0.73	1.08	0.82
Net emission of acid gas per unit of fossil-based generation (g/kW.h) [D]									
Sulphur dioxide	**7.24**	7.73	4.89	7.92	4.77	7.51	4.86	7.60	5.06
Nitrogen oxides	**2.50**	2.79	1.74	2.89	1.73	2.99	1.82	2.93	1.98
Reportable spills [E]	**14**	22	1,173	12	1,167	23	904	19	1,057
Priority spills [F]	**1**	2	82	0	87	3	74	1	94
PCB in storage (tonnes) [G]									
High level	**1**	2	55.3	9	104	4	116	1	580
Low level	**13**	31	11,014	15	849	31	863	51	1,033
PCB sent for destruction (tonnes) High and low level	**42**	38	733.8	38	1,703	73	1,939	54	1,592

A Internal efficiencies and emissions for SaskPower are comparable to the averages reported through the ECR Program. Slightly lower efficiencies and higher emissions for generation – including energy conversion efficiency for fossil-based generation – are due in part to the operation of older, yet reliable and cost effective, generation facilities.

B The average percentages for flyash use are dependent on the proportion of coal-fired generation by CEA members and their proximity to markets for flyash.

C The percentages reported by SaskPower for insulating oil reuse are comparable to the average reported by CEA member utilities. However, in 1999 a supply and position of insulating oil was sold to Great Plains Alliance for re-refining.

D In 2003, the methodology to calculate emissions was modified, resulting in revisions to historical emissions data.

E The data reported through the ECR Program for reportable and priority spills, as well as PCBs in storage and sent for destruction, are representative of the overall impact of all Canadian utilities, including SaskPower, that have been participating in the industry-wide program.

F In compliance with the CEA ECR Program reporting guidelines, reportable spills are considered priority spills if the substance is a petroleum product or PCB-contaminated, and any one of the following: a test spill or volume greater than 100 litres; a spilled substance that enters a watercourse; or a spill that affects local groundwater or a drinking water supply. In 2003, the single priority spill that SaskPower experienced involved a petroleum product of over 500 litres.

G According to the ECR Program guidelines, "high level PCB material is defined as any material (including equipment) with a PCB concentration greater than 10,000 ppm," "low level PCB material is defined as any material (including equipment) with a PCB concentration of greater than 50 ppm but less than 10,000 ppm."

GLOSSARY

Amine scrubbing
Removal of CO_2 from flue gases using solvents that rely on chemical or physical absorption.

Biogas
Methane created from the decomposition of organic matter such as manure or landfill waste; can be used to power engines to generate heat and electricity.

Biomass
Energy resources derived from organic matter. These include wood, agricultural waste and other living-cell material that can be burned to produce heat energy.

Carbon dioxide equivalent (CO_2e)
A unit of measurement used to calculate the impact of the various gases involved in global warming.

Carbon dioxide equivalent offsets
Initiatives designed to reduce net CO_2 from the burning of fossil fuels. Offsets are carried out independently of the source emissions.

Cogeneration
Simultaneous production of heat energy and electrical power from the same fuel in the same facility. The use of waste heat (as in steam) from an industrial process to produce electricity or the use of steam or hot water from electric power generation as a heating source.

Chromium
A metallic chemical element naturally occurring in soils that can be found as a component in a variety of industrial applications.

Distribution
Process of moving electric energy at lower voltages from major substations to customers.

EcoLogo
The registered trademark of Environment Canada's Environmental Choice Program. An independent firm evaluates the product applications and certifies the products that qualify as low-impact renewable electricity.

Electric fields
Invisible fields of force created by electric voltage, measured in volts/metre (V/m).

Electrostatic precipitator (ESP)
A device for removing particles of ash, dust, smoke and other elements from air and gas flows.

Environmental Management System (EMS)
Part of an overall management system which includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing and maintaining an environmental policy.

Flyash
Fine powder resulting from the combustion of pulverized coal used in many coal-fired generating stations.

Fossil-based generation
Includes coal and natural gas fired generation of electricity.

Gigawatt Hour (GW.h)
A unit of bulk energy; 1,000,000 kilowatt hours.

GreenPower
An EcoLogo-certified product offered by SaskPower that provides customers with the opportunity to purchase blocks of electricity produced from renewable resources with little or no environmental impact.

Greenhouse gas (GHG)
Naturally-occurring gases such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) that trap heat in the earth's lower atmosphere.

ISO 14001
A standard that defines the elements of a sound environmental management system. The ISO 14000 Series is a family of environmental management standards developed by the International Organization for Standardization (ISO).

Kilovolt (kV)
A unit of pressure, or push, of an electric current; 1,000 volts.

Kilowatt hour (kW.h)
A unit of bulk energy; 1,000 watt hours. The measurement is generally used for billing residential customers.

Kyoto Protocol
An international agreement, reached in 1997 in Kyoto, Japan, by parties subject to the United Nations Framework Convention on Climate Change (UNFCCC). The agreement extends the commitments of the UNFCCC by establishing greenhouse gas emission targets for participating developed countries.

Landfarming
A remediation method in which contaminated soils are periodically turned over or tilled to aerate the soil and encourage microbial activity, which breaks down the contaminants.

Lignite
A low-grade coal, intermediate between peat and bituminous, lignite has the lowest energy content among the various grades.

Magnetic fields
Invisible fields of force created by electric current, measured in microtesla (mT) or milligauss (mG).

Megawatt (MW)
A unit of bulk power; 1,000 kilowatts. The output of a commercial generator or power station is usually expressed in megawatts.

Oxy-fuel process
Combustion in the presence of oxygen, which results in a flue gas containing almost exclusively water and carbon dioxide.

Particulate matter
Emissions of ash particles from the burning of fossil fuels.

Pentachlorophenol (PCP)
A chemical compound used mainly as a wood preservative.

Phase I Environmental Site Assessment
The process used to determine whether a particular property is or may be subject to contamination.

Phase II Environmental Site Assessment
The process used to characterize and/or delineate the concentrations or quantities of substances of concern related to a site, and compare those levels to criteria.

Phenols
A class of aromatic alcohols that occur naturally in petroleum and petroleum products.

Polychlorinated biphenyls (PCBs)
A group of organic compounds that were once used as cooling and insulating fluids in various types of electrical equipment, including transformers and capacitors.

Spilling
Releasing excess water into a channel around or over a dam rather than through the turbines to maintain reservoir levels at a safe volume which the dam is built to contain.

Transmission
Process of moving electric power in bulk at higher voltages from the source of supply to distribution centres.

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We value your feedback and involvement. To learn more about our programs and initiatives, please visit us on-line at saskpower.com or contact:

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